

## PATENT ABSTRACTS OF JAPAN

(11)Publication number : 2002-340206

(43)Date of publication of application : 27.11.2002

(51)Int.Cl.

F16K 15/20

B60C 29/02

(21)Application number : 2001-141745

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(22)Date of filing : 11.05.2001

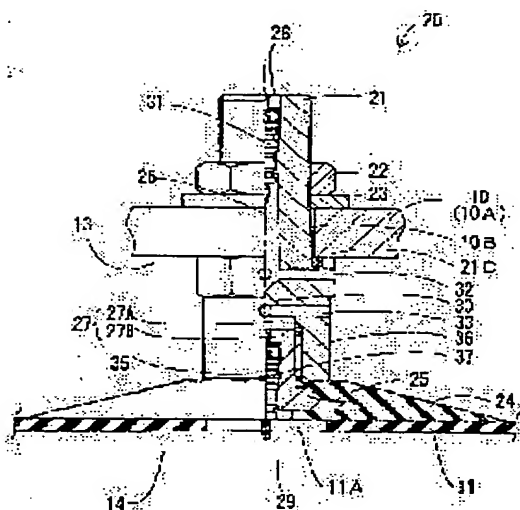
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## (54) VALVE FOR TIRE

## (57)Abstract

PROBLEM TO BE SOLVED: To provide a valve for a tire for charging air to an outside air chamber and an inside air chamber arranged in the tire of a double structure.

SOLUTION: This valve for the tire is characterized by having a first valve core 31 for allowing a movement of air in the tire, and regulating the movement of air to the outside of the tire, and a second valve core 35 housed in a second air supply passage 27, allowing the movement of air in the inside air chamber 14 when the inside of the second air supply passage becomes prescribed pressure, and regulating the movement of air to the outside of the inside air chamber.



## LEGAL STATUS

[Date of request for examination]

[Date of sending the examiner's decision of rejection]

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

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**CLAIMS**


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**[Claim(s)]**

[Claim 1] The bulb for tires characterized by providing the following. The hollow stem which is a bulb for tires for charging air, penetrated the aforementioned outside air chamber (13), and the end exposed to the outside of the aforementioned tire (12), and the other end faced the outside air chamber (13) and inside air chamber (14) with which the tire (12) of dual structure was equipped inside the aforementioned inside air chamber (14) (21) it juts out of the aforementioned hollow stem (21) over the side, and the aforementioned inside air chamber (14) is fixed in the periphery section of the hole (11A) which the aforementioned hollow stem (21) penetrated among wrap interior walls (11) — having — the above — the spats (24) for sealing a hole (11A) The 1st air-supply way which was formed in the interior of the aforementioned hollow stem (21), was continued and prolonged at the end from the interstitial segment of the aforementioned hollow stem (21), and was connected to the outside of the aforementioned tire (12) (26) The 2nd air-supply way which was formed in the interior of the aforementioned hollow stem (21), was continued and prolonged in the other end from the interstitial segment of the aforementioned hollow stem (21), and was connected to the aforementioned inside air chamber (14) (27), The back wall which is prepared in the aforementioned hollow stem (21) and divides the aforementioned 1st air-supply way (26) and the aforementioned 2nd air-supply way (27) (30), The middle discharge way which was formed in the interstitial segment of the aforementioned hollow stem (21), and connected the aforementioned 1st air-supply way (26) to the aforementioned outside air chamber (13) (32), The reduced pressure path which was formed in the interstitial segment of the aforementioned hollow stem (21), and connected the aforementioned 2nd air-supply way (27) to the aforementioned outside air chamber (13) (33), The 1st valve core which is held in the aforementioned 1st air-supply way (26), permits movement of the air into the aforementioned tire (12), and regulates movement of the air to the outside of the aforementioned tire (12) (31), The 2nd valve core which permits movement of the air into the aforementioned inside air chamber (14) when it holds in the aforementioned 2nd air-supply way (27) and the inside of the aforementioned 2nd air-supply way (27) becomes a predetermined pressure, and regulates movement of the air to the outside of the aforementioned inside air chamber (14) (35)

[Claim 2] The bulb for tires for charging air to the outside air chamber (13) and inside air chamber (14) which are characterized by providing the following and with which the tire (12) of dual structure was equipped The hollow stem which penetrated the aforementioned outside air chamber (13), and the end exposed to the outside of the aforementioned tire (12), and the other end faced inside the aforementioned inside air chamber (14) (21) it juts out of the aforementioned hollow stem (21) over the side, and the aforementioned inside air chamber (14) is fixed in the periphery section of the hole (11A) which the aforementioned hollow stem (21) penetrated among wrap interior walls (11) — having — the above — the spats (24) for sealing a hole (11A) The 1st air-supply way which was formed in the interior of the aforementioned hollow stem (21), was continued and prolonged at the end from the interstitial segment of the aforementioned hollow stem (21), and was connected to the outside of the aforementioned tire (12) (26) The 2nd air-supply way which was formed in the interior of the aforementioned hollow

stem (21), was continued and prolonged in the other end from the interstitial segment of the aforementioned hollow stem (21), and was connected to the aforementioned inside air chamber (14) (27). When air is supplied to the middle discharge way (32) which was formed in the interstitial segment of the aforementioned hollow stem (21), and connected the aforementioned 1st air-supply way (26) to the aforementioned outside air chamber (13), and the aforementioned outside air chamber (13) The reduced pressure path for decompressing the air in the aforementioned 1st air-supply way (26), and incorporating it on the aforementioned 2nd air-supply way (27) (32, 33, 41). The 1st valve core which is held in the aforementioned 1st air-supply way (26), permits movement of the air into the aforementioned tire (12), and regulates movement of the air to the outside of the aforementioned tire (12) (31). The 2nd valve core which permits movement of the air into the aforementioned inside air chamber (14) when it holds in the aforementioned 2nd air-supply way (27) and the inside of the aforementioned 2nd air-supply way (27) becomes a predetermined pressure, and regulates movement of the air to the outside of the aforementioned inside air chamber (14) (35)

[Claim 3] The aforementioned reduced pressure path (41) is a bulb for tires according to claim 2 characterized by being constituted so that the aforementioned 1st air-supply way (26) may be extracted and the aforementioned 2nd air-supply way (27) may be connected with.

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the bulb for tires for charging air to the outside air chamber and inside air chamber which were prepared in the tire of dual structure.

[0002]

[Description of the Prior Art] What was carried by JP,41-1961,B is shown in drawing 10 as an example of the conventional bulb for dual structure tires. This bulb equips with the 1st and 2nd valve cores 3 and 4 the ends of the air-supply way 2 which penetrated the hollow stem 1 to shaft orientations, and the middle discharge way 6 which connects the room between both the valve cores 3 and 4 and the outside air chamber 5 of a tire among the air-supply ways 2 is formed at the interstitial segment of the hollow stem 1. And if air is charged from the end side of the hollow stem 1, the 1st valve core 3 will be opened for traffic, air will be sent to the air-supply way 2, and air will be supplied by the pressure in the outside air chamber 5 through the middle discharge way 6. Moreover, at this time, the 2nd valve core 4 is also opened for traffic, and air is supplied in the inside air chamber 7 of a tire by the pressure in the air-supply way 2.

[0003]

[Problem(s) to be Solved by the Invention] However, by the conventional bulb for tires mentioned above, since both the valve cores 3 and 4 were arranged in in the same air-supply way 2 and the 2nd valve core 4 has met the exhaust port of the 1st valve core 3, the 2nd valve core 4 opens with a charge start in response to the pneumatic pressure from the 1st valve core 3, and much air is previously supplied to the inside air chamber 7 side. For this reason, the situation which a wrap, for example, the tube which is not illustrated, expands the inside air chamber 7 too much, and narrows the outside air chamber 5 within a tire might arise.

[0004] this invention aims at offer of the bulb for tires which can charge air with sufficient balance to the internal and external air chamber of a dual structure tire, in order to solve the above-mentioned technical problem.

[0005]

[Means for Solving the Problem] The bulb for tires concerning invention of the claim 1 made in order to attain the above-mentioned purpose To the outside air chamber (13) and inside air chamber (14) with which the tire (12) of dual structure was equipped, are a bulb for tires for charging air, and an outside air chamber (13) is penetrated. The hollow stem which the end exposed to the outside of a tire (12), and the other end faced inside the inside air chamber (14) (21), The spats for jutting out of a hollow stem (21) over the side, fixing an inside air chamber (14) in the periphery section of the hole (11A) which the hollow stem (21) penetrated among wrap interior walls (11), and sealing a hole (11A) (24), The 1st air-supply way which was formed in the interior of a hollow stem (21), was continued and prolonged at the end from the interstitial segment of a hollow stem (21), and was connected to the outside of a tire (12) (26), The 2nd air-supply way which was formed in the interior of a hollow stem (21), was continued and prolonged in the other end from the interstitial segment of a hollow stem (21), and was connected to the inside air chamber (14) (27), The back wall which is prepared in a hollow stem (21) and divides

the 1st air-supply way (26) and the 2nd air-supply way (27) (30), The middle discharge way which was formed in the interstitial segment of a hollow stem (21), and connected the 1st air-supply way (26) to the outside air chamber (13) (32), The reduced pressure path which was formed in the interstitial segment of a hollow stem (21), and connected the 2nd air-supply way (27) to the outside air chamber (13) (33), The 1st valve core which is held in the 1st air-supply way (26), permits movement of the air into a tire (12), and regulates movement of the air to the outside of a tire (12) (31), When it holds in the 2nd air-supply way (27) and the inside of the 2nd air-supply way (27) becomes a predetermined pressure, movement of the air into an inside air chamber (14) is permitted, and it has the feature at the place equipped with the 2nd valve core (35) which regulates movement of the air to the outside of an inside air chamber (14).

[0006] To the outside air chamber (13) and inside air chamber (14) with which the tire (12) of dual structure was equipped, the bulb for tires concerning invention of a claim 2 is a bulb for tires for charging air, and penetrates an outside air chamber (13). The hollow stem which the end exposed to the outside of a tire (12), and the other end faced inside the inside air chamber (14) (21), The spats for jutting out of a hollow stem (21) over the side, fixing an inside air chamber (14) in the periphery section of the hole (11A) which the hollow stem (21) penetrated among wrap interior walls (11), and sealing a hole (11A) (24), The 1st air-supply way which was formed in the interior of a hollow stem (21), was continued and prolonged at the end from the interstitial segment of a hollow stem (21), and was connected to the outside of a tire (12) (26), The 2nd air-supply way which was formed in the interior of a hollow stem (21), was continued and prolonged in the other end from the interstitial segment of a hollow stem (21), and was connected to the inside air chamber (14) (27), When air is supplied to the middle discharge way (32) which was formed in the interstitial segment of a hollow stem (21), and connected the 1st air-supply way (26) to the outside air chamber (13), and the outside air chamber (13) The reduced pressure path for decompressing the air in the 1st air-supply way (26), and incorporating it on the 2nd air-supply way (27) (32, 33, 41), The 1st valve core which is held in the 1st air-supply way (26), permits movement of the air into a tire (12), and regulates movement of the air to the outside of a tire (12) (31), When it holds in the 2nd air-supply way (27) and the inside of the 2nd air-supply way (27) becomes a predetermined pressure, movement of the air into an inside air chamber (14) is permitted, and it has the feature at the place equipped with the 2nd valve core (35) which regulates movement of the air to the outside of an inside air chamber (14).

[0007] Invention of a claim 3 has the feature in the bulb for tires according to claim 2 at the place constituted so that a reduced pressure path (41) might extract the 1st air-supply way (26) and might connect it to the 2nd air-supply way (27).

[0008]

[Function and Effect of the Invention] In the initial stage which charges air in a <invention of claim 1> tire (12) Even if the air in the 1st air-supply way (26) is emitted to an outside air chamber (13), the atmospheric pressure of an outside air chamber (13) Since it does not go up rapidly, the atmospheric pressure in the 2nd air-supply way (27) which incorporated the air of an outside air chamber (13) through the reduced pressure path (33) does not go up rapidly, either, but the 2nd valve core (35) becomes having closed with as from a charge start for the time being. Thereby, air is previously supplied to an outside air chamber (13). And if the atmospheric pressure in the 2nd air-supply way (27) goes up with elevation of the atmospheric pressure in an outside air chamber (13), the 2nd valve core (35) will open and air will come to be supplied to an inside air chamber (14). Thus, according to this invention, since air is supplied to an outside air chamber (13) ahead of an inside air chamber (14), the situation where an inside air chamber (14) expands too much, and an outside air chamber (13) becomes narrow is prevented, and air can be charged with sufficient balance to both internal and external air chambers (13 14).

[0009] In the initial stage which charges air in a <invention of claims 2 and 3> tire (12), air is sent in the 1st air-supply way (26) by the big rate of flow, and while the air is supplied to an outside air chamber (13) through a middle discharge way, it is greatly decompressed in a reduced pressure path (32, 33, 41), and enters the 2nd air-supply way (27). Therefore, in the initial stage of charge, the atmospheric pressure in the 2nd air-supply way (27) does not go up rapidly, but the 2nd valve core (35) will be in a stoppage state, and air will be supplied to an outside air

chamber (13) for the time being. And if the rate of flow of air becomes small with elevation of the atmospheric pressure in an outside air chamber (13), a reduced pressure operation will fall and the atmospheric pressure in the 2nd air-supply way (27) will also go up. Then, the 2nd valve core (35) opens and air comes to be supplied to an inside air chamber (14). Thus, according to this invention, since air is supplied to an outside air chamber (13) ahead of an inside air chamber (14), the situation where an inside air chamber (14) expands too much, and an outside air chamber (13) becomes narrow is prevented, and air can be charged with sufficient balance to both internal and external air chambers (13 14). In addition, a reduced pressure path (33) may constitute a reduced pressure path (41) so that the 1st air-supply way (26) may be extracted and the 2nd air-supply way (27) may be connected with (invention of a claim 3).

[0010]

[Embodiments of the Invention] The 1st operation gestalt of this invention is explained based on drawing 1 - drawing 8 below the <1st operation gestalt>. As shown in drawing 1, the tire of the dual structure of this operation gestalt prepares space for the outside of the tube 11 which fitted into the peripheral face of the rim 10 for wheels, and its tube 11 between the wrap tires 12, and makes the structure where one pair of inner circumference edges of the tire 12 were stuck to the rim 10. Thereby, the inside air chamber 14 blockaded by the tube 11 is formed inside the outside air chamber 13 blockaded by the rim 10 and the tire 12.

[0011] The interstitial segment into which the tube 11 fitted among the cross direction (longitudinal direction of drawing 1) of the peripheral face of a rim 10 has caved in the \*\* with the stage, and the bulb 20 (only henceforth "a bulb 20") for tires concerning this invention is attached in breakthrough 10B formed in level difference section 10A of the rim 10.

[0012] A bulb 20 is expanded to drawing 2, and is shown, it has the hollow stem 21 prolonged in the vertical direction of this drawing, and this hollow stem 21 is inserted in the aforementioned breakthrough 10B from the inside of a rim 10. And level difference side 21C formed in the interstitial segment of the hollow stem 21 is dashed against the marginal part of breakthrough 10B, and the hollow stem 21 is fixed to the rim 10 by inserting in and screwing a nut 22 with a washer 23 from the outside of a rim 10. In addition, an O ring is allotted between the aforementioned level difference side 21C of the hollow stem 21, and the marginal part of breakthrough 10B, and airtightness is secured to it.

[0013] The core housing 37 explained in full detail behind is attached to the soffit section in drawing 2 among the hollow stems 21, and the spats 24 made of rubber fixed to the flange 25 formed in the core housing 37, and it has jutted out into the side. the air supply which took spats 24 toward the outside from the core, and thickness formed in the tube 11 by being thin — a hole — it has fixed with adhesives in the periphery section of 11A while the termination (edge of the bottom in drawing 2) of the hollow stem 21 is fixed to the state where it faced in the inside air chamber 14, by this — air supply — a hole — 11A is sealed. In addition, spats 32 are shown in the state where it was pressed against the rim 10 and crooked in drawing 1. the interior of the hollow stem 21 — the nose of cam (edge of the top in drawing 2) from the interstitial segment of the hollow stem 21 — continuing — the 1st air-supply way 26 — being prolonged — \*\*\*\* — the end — opening of the outside air chamber 13 — it is the charge mouth 28 the bottom. Moreover, if termination is covered from the interstitial segment of the hollow stem 21, the 2nd air-supply way 27 is prolonged and the end has become the termination discharge mouth 29 which the inside air chamber 14 opened wide.

[0015] The between where these 1st air-supply way 26 and the 2nd air-supply way 27 are mutual is divided by the back wall 30. And the 1st air-supply way 26 is connected to the outside air chamber 13 by the middle discharge way 32 which intersected perpendicularly with the aforementioned back wall 30 side among the 1st air-supply ways 26. Moreover, the 2nd air-supply way 27 is connected to the outside air chamber 13 according to the reduced pressure path 33 which intersected perpendicularly with the back wall 30 side of the 2nd air-supply way 27. In addition, with this operation gestalt, these middle discharge way 32 and the reduced pressure path 33 have composition prolonged toward the four way type focusing on the axis section in the hollow stem 21, respectively.

[0016] The 1st and 2nd valve cores 31 and 35 are held in the interior of the above 1st and the

2nd air-supply way 26 and 27, respectively. Specifically, the diameter of a portion is expanded a little towards the charge mouth 28 side the middle, and the 1st air-supply way 26 has screwed the 1st valve core 31 in the thread part formed in the inner skin of the charge mouth 28 approach of the 1st air-supply way 26. And only movement of the air from the outside of a tire 12 to into a tire 12 is permitted, and movement of air to the opposite direction is regulated by this 1st valve core 31.

[0017] On the other hand, the portion has become narrower a little towards the termination discharge mouth 29 side the middle, and the 2nd air-supply way 27 has screwed the 2nd valve core 35 in the thread part formed in the inner skin of the inner approach of the 2nd air-supply way 27. In order to attach this 2nd valve core 35 in the 2nd air-supply way 27, the trailer of the hollow stem 21 comes to attach the aforementioned core housing 37 to this soma 36 of the hollow stem 21. And the aforementioned 2nd air-supply way 27 is constituted by the 2nd air-supply ways 27A and 27B formed in these book soma 36 and the core housing 37, respectively. More, after the core housing 37 screws the 2nd valve core 35 in 2nd air-supply way 27A which was constituted in preparation for the end of a cylinder object, and equipped the core housing 37 with the aforementioned flange 25, it is screwed in at the detail in 2nd air-supply way 27B which equipped this soma 36 with the core housing 37. And only movement of the air into the inside air chamber 14 is permitted, and movement of air to the opposite direction is regulated by this 2nd valve core 35. In addition, said spats 24 are inserted between the end face of this soma 36, and the core housing 37, and airtightness is secured.

[0018] Both the valve cores 31 and 35 of both make the general structure specified to JIS (Japanese Industrial Standards). Then, it is as follows when only the composition of the 1st valve core 31 is explained based on drawing 6 and drawing 7. That is, the 1st valve core 31 fixes and equips with the flange-like rubber stopper 62 the end side of the shaft 61 inserted in the sleeve 60, it is energizing a shaft 61 to one side by the coil spring 63 held in the sleeve 60, and the rubber stopper 62 is pushed against end opening of a sleeve 60 at the usual state (refer to drawing 6). And when air is charged from a rubber stopper 62 and an opposite side among shafts 61, a shaft 61 resists and moves to a coil spring 63 with the atmospheric pressure received in the end face of a shaft 61, and as shown in drawing 7, air passes [ a rubber stopper 62 ] through the inside of a detached building of a sleeve 60 and the 1st valve core 31. On the other hand, since the compressed air from a rubber stopper 62 side pushes a rubber stopper 62 against end opening of a sleeve 60, it cannot pass a valve core 31.

[0019] Next, operation of the bulb 20 of this operation gestalt which consists of the above-mentioned composition is explained. Change of the pressure in the outside air chamber 13 at the time of charging the compressed air in a tire 12 from a bulb 20 (Pa) and the pressure in the inside air chamber 14 (Pb) is shown in drawing 8.

[0020] In the state before starting charge, though air is not contained in the internal and external air chambers 13 and 14 or air is contained in them, the pressure of each internal and external air chambers 13 and 14 is the almost same grade as for example both atmospheric pressure (refer to the section of T1 of drawing 8). Moreover, within [ both ] the bulb 20, the 1st and 2nd valve cores 31 and 35 have closed at this time (refer to drawing 2).

[0021] If the air-supply hose which is not illustrated is connected to the charge mouth 28 of a bulb 20 and it begins to charge air, in response to the charge \*\* (Po), the 1st valve core 31 will open (refer to drawing 3), and air will be sent in the 1st air-supply way 26. Here, since the 1st air-supply way 26 is divided with the 2nd air-supply way 27 by the back wall 30, as for the pneumatic pressure which passed the 1st valve core 31, it does not start the 2nd valve core 35 soon, and the 2nd valve core 35 does not open it with a charge start. Moreover, although the air in the 1st air-supply way 26 passes along the reduced pressure path 33 from the outside air chamber 13 and being entered in the 2nd air-supply way 27, compared with the 1st air-supply way 26, atmospheric pressure does not rise rapidly from latus, therefore, as for the outside air chamber 13, the atmospheric pressure in the 2nd air-supply way 27 does not rise rapidly, either. Therefore, the 2nd valve core 35 is not opened from a charge start for the time being, and air is previously supplied only to the outside air chamber 13.

[0022] Now, if air is supplied to the outside air chamber 13 and the pressure in the outside air



chamber 13 rises gradually (refer to the section of T2 of drawing 8 ), in connection with this, the atmospheric pressure in the 2nd air-supply way 27 will also rise. And if the atmospheric pressure in the 2nd air-supply way 27 reaches a predetermined injection-valve opening pressure ( $P_k$ ), 2nd bulb 35 core will open (refer to drawing 4 ), and air will be supplied to both internal and external air chambers 13 and 14. And as the atmospheric pressure in the inside air chamber 14 ( $P_b$ ) follows the atmospheric pressure in the outside air chamber 13 ( $P_a$ ), it rises gradually (refer to the section of T3 of drawing 8 ).

[0023] When it goes up until the pressure ( $P_a$ ) of the outside air chamber 13 becomes the same as charge \*\* ( $P_o$ ) (refer to termination side of the T3 section of drawing 8 ), the 1st valve core 31 will be in a stoppage state, and air will stop subsequently, entering in a bulb 20 from an air-supply hose, as shown in drawing 5 . Later than this, the pressure of the outside air chamber 13 and the inside air chamber 14 becomes the same soon (refer to the section of T4 of drawing 8 ), the 2nd valve core 35 in the outside air chamber 13 stops (refer to drawing 2 ), and charge of the air into a tire 12 is completed.

[0024] Thus, according to the bulb 20 of an operation gestalt, since air is supplied to the outside air chamber 13 ahead of the inside air chamber 14, the situation where the inside air chamber 14 expands too much, and the outside air chamber 13 becomes narrow is prevented, and air can be charged with sufficient balance to both the internal and external air chambers 13 and 14. And since it is accepted outside air chamber 13, and it is automatic and the charge through which it passes, and the charge to the inside air chamber 14 are changed, improvement in the efficiency of charge work is achieved compared with what changes these manually.

[0025] The bulb 40 for tires of the <2nd operation gestalt> book operation gestalt is shown in drawing 9 , and only the composition of a reduced pressure path differs from the aforementioned 1st operation gestalt. That is, the reduced pressure path 41 is making the so-called reducer structure which extracted and connected between the 1st air-supply way 26 and the 2nd air-supply ways 27, as shown in this drawing. Moreover, the cross section of this reduced pressure path 41 is small compared with the gross area of the middle discharge way 32 prolonged on all sides. About other composition, since it is the same as that of the 1st operation gestalt, the same agreement is given to the same part as the 1st operation gestalt, and duplication explanation is omitted to it.

[0026] According to this composition, in the initial stage which charges air in a tire 12, while air is sent in the 1st air-supply way 26 by the big rate of flow and the outside air chamber 13 is supplied through the middle discharge way 32, it decompresses greatly in the reduced pressure path 41, and the 2nd air-supply way 27 is entered. Thereby, in the initial stage of charge, the 2nd valve core 35 will be in a stoppage state, and air will be supplied only to the outside air chamber 13 for the time being. And if the rate of flow of air becomes small with elevation of the atmospheric pressure in the outside air chamber 13, a reduced pressure operation will fall and the atmospheric pressure in the 2nd air-supply way 27 will also go up. Then, the 2nd valve core 35 will be in an opening-of-traffic state, and air will be supplied also to the inside air chamber 14.

[0027] Thus, air is chargeable with sufficient balance to both the internal and external air chambers 13 and 14 with this operation gestalt as well as the aforementioned 1st operation gestalt. Moreover, since the reduced pressure path 41 was established on the same axle of the 1st and 2nd air-supply ways 26 and 27, the reduced pressure path 41 can be formed easily.

[0028] It is not limited to an operation gestalt and an operation gestalt which is explained below is also included in the technical range of this invention, and further, within limits which do not deviate from a summary besides the following, an operation gestalt > this invention besides < can be changed variously, and can be carried out.

(1) Although the tire of the dual structure illustrated in the aforementioned 1st operation gestalt was the structure equipped with the tube 11 inside the tire 12 May make the tire of dual structure into \*\*\*\*, for example, the structure which prepared the inner tire with intensity higher than a tube inside the tire, with the structure equipped with the internal and external air chamber, and Moreover, you may make it the structure which allotted rubber material with intensity higher than the tube 11 to the superficies of the tube 11 of the aforementioned 1st

operation gestalt.

[0029] (2) Although the middle discharge way 32 and the reduced pressure path 33 were formed in the direction which intersects perpendicularly with the shaft orientations of the hollow stem 21 with the aforementioned 1st operation gestalt, you may form a middle discharge way and a reduced pressure path in the direction which intersects the hollow stem 21 aslant.

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**TECHNICAL FIELD**

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[The technical field to which invention belongs] this invention relates to the bulb for tires for charging air to the outside air chamber and inside air chamber which were prepared in the tire of dual structure.

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PRIOR ART

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[Description of the Prior Art] What was carried by JP,41-1961,B is shown in drawing 10 as an example of the conventional bulb for dual structure tires. This bulb equips with the 1st and 2nd valve cores 3 and 4 the ends of the air-supply way 2 which penetrated the hollow stem 1 to shaft orientations, and the middle discharge way 6 which connects the room between both the valve cores 3 and 4 and the outside air chamber 5 of a tire among the air-supply ways 2 is formed at the interstitial segment of the hollow stem 1. And if air is charged from the end side of the hollow stem 1, the 1st valve core 3 will be opened for traffic, air will be sent to the air-supply way 2, and air will be supplied by the pressure in the outside air chamber 5 through the middle discharge way 6. Moreover, at this time, the 2nd valve core 4 is also opened for traffic, and air is supplied in the inside air chamber 7 of a tire by the pressure in the air-supply way 2.

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## EFFECT OF THE INVENTION

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[Function and Effect of the Invention] In the initial stage which charges air in a <invention of claim 1> tire (12) Even if the air in the 1st air-supply way (26) is emitted to an outside air chamber (13), the atmospheric pressure of an outside air chamber (13) Since it does not go up rapidly, the atmospheric pressure in the 2nd air-supply way (27) which incorporated the air of an outside air chamber (13) through the reduced pressure path (33) does not go up rapidly, either, but the 2nd valve core (35) becomes having closed with as from a charge start for the time being. Thereby, air is previously supplied to an outside air chamber (13). And if the atmospheric pressure in the 2nd air-supply way (27) goes up with elevation of the atmospheric pressure in an outside air chamber (13), the 2nd valve core (35) will open and air will come to be supplied to an inside air chamber (14). Thus, according to this invention, since air is supplied to an outside air chamber (13) ahead of an inside air chamber (14), the situation where an inside air chamber (14) expands too much, and an outside air chamber (13) becomes narrow is prevented, and air can be charged with sufficient balance to both internal and external air chambers (13 14).

[0009] In the initial stage which charges air in a <invention of claims 2 and 3> tire (12), air is sent in the 1st air-supply way (26) by the big rate of flow, and while the air is supplied to an outside air chamber (13) through a middle discharge way, it is greatly decompressed in a reduced pressure path (32, 33, 41), and enters the 2nd air-supply way (27). Therefore, in the initial stage of charge, the atmospheric pressure in the 2nd air-supply way (27) does not go up rapidly, but the 2nd valve core (35) will be in a stoppage state, and air will be supplied to an outside air chamber (13) for the time being. And if the rate of flow of air becomes small with elevation of the atmospheric pressure in an outside air chamber (13), a reduced pressure operation will fall and the atmospheric pressure in the 2nd air-supply way (27) will also go up. Then, the 2nd valve core (35) opens and air comes to be supplied to an inside air chamber (14). Thus, according to this invention, since air is supplied to an outside air chamber (13) ahead of an inside air chamber (14), the situation where an inside air chamber (14) expands too much, and an outside air chamber (13) becomes narrow is prevented, and air can be charged with sufficient balance to both internal and external air chambers (13 14). In addition, a reduced pressure path (33) may constitute a reduced pressure path (41) so that the 1st air-supply way (26) may be extracted and the 2nd air-supply way (27) may be connected with (invention of a claim 3).

[0010]

[Embodiments of the Invention] The 1st operation form of this invention is explained based on drawing 1 - drawing 8 below the <1st operation form>. As shown in drawing 1, the tire of the dual structure of this operation form prepares space for the outside of the tube 11 which fitted into the peripheral face of the rim 10 for wheels, and its tube 11 between the wrap tires 12, and makes the structure where one pair of inner circumference edges of the tire 12 were stuck to the rim 10. Thereby, the inside air chamber 14 blockaded by the tube 11 is formed inside the outside air chamber 13 blockaded by the rim 10 and the tire 12.

[0011] The interstitial segment into which the tube 11 fitted among the cross direction (longitudinal direction of drawing 1) of the peripheral face of a rim 10 has caved in the \*\* with the stage, and the bulb 20 (only henceforth "a bulb 20") for tires concerning this invention is attached in breakthrough 10B formed in level difference section 10A of the rim 10.

[0012] A bulb 20 is expanded to drawing 2, and is shown, it has the hollow stem 21 prolonged in the vertical direction of this drawing, and this hollow stem 21 is inserted in the aforementioned breakthrough 10B from the inside of a rim 10. And level difference side 21C formed in the interstitial segment of the hollow stem 21 is dashed against the edge of breakthrough 10B, and the hollow stem 21 is fixed to the rim 10 by inserting in and screwing a nut 22 with a washer 23 from the outside of a rim 10. In addition, an O ring is allotted between the aforementioned level difference side 21C of the hollow stem 21, and the edge of breakthrough 10B, and airtightness is secured to it.

[0013] The core housing 37 explained in full detail behind is attached to the soffit section in drawing 2 among the hollow stems 21, and the spats 24 made of rubber fixed to the flange 25 formed in the core housing 37, and it has jutted out into the side. the air supply which took spats 24 toward the outside from the core, and thickness formed in the tube 11 by being thin — a hole — it has fixed with adhesives in the periphery section of 11A while the termination (edge of the bottom in drawing 2) of the hollow stem 21 is fixed to the state where it faced in the inside air chamber 14, by this — air supply — a hole — 11A is sealed. In addition, spats 32 are [0014] shown in the state where it was pressed against the rim 10 and crooked in drawing 1. the interior of the hollow stem 21 — the nose of cam (edge of the top in drawing 2) from the interstitial segment of the hollow stem 21 — continuing — the 1st air-supply way 26 — being prolonged — \*\*\*\* — the end — opening of the outside air chamber 13 — it is the charge mouth 28 the bottom. Moreover, if termination is covered from the interstitial segment of the hollow stem 21, the 2nd air-supply way 27 is prolonged and the end has become the termination discharge mouth 29 which the inside air chamber 14 opened wide.

[0015] The between where these 1st air-supply way 26 and the 2nd air-supply way 27 are mutual is divided by the back wall 30. And the 1st air-supply way 26 is connected to the outside air chamber 13 by the middle discharge way 32 which intersected perpendicularly with the aforementioned back wall 30 side among the 1st air-supply ways 26. Moreover, the 2nd air-supply way 27 is connected to the outside air chamber 13 according to the reduced pressure path 33 which intersected perpendicularly with the back wall 30 side of the 2nd air-supply way 27. In addition, with this operation gestalt, these middle discharge way 32 and the reduced pressure path 33 have composition prolonged toward the four way type focusing on the axis section in the hollow stem 21, respectively.

[0016] The 1st and 2nd valve cores 31 and 35 are held in the interior of the above 1st and the 2nd air-supply way 26 and 27, respectively. Specifically, the diameter of a portion is expanded a little towards the charge mouth 28 side the middle, and the 1st air-supply way 26 has screwed the 1st valve core 31 in the thread part formed in the inner skin of the charge mouth 28 approach of the 1st air-supply way 26. And only movement of the air from the outside of a tire 12 to into a tire 12 is permitted, and movement of air to the opposite direction is regulated by this 1st valve core 31.

[0017] On the other hand, the portion has become narrower a little towards the termination discharge mouth 29 side the middle, and the 2nd air-supply way 27 has screwed the 2nd valve core 35 in the thread part formed in the inner skin of the inner approach of the 2nd air-supply way 27. In order to attach this 2nd valve core 35 in the 2nd air-supply way 27, the trailer of the hollow stem 21 comes to attach the aforementioned core housing 37 to this soma 36 of the hollow stem 21. And the aforementioned 2nd air-supply way 27 is constituted by the 2nd air-supply ways 27A and 27B formed in these book soma 36 and the core housing 37, respectively. More, after the core housing 37 screws the 2nd valve core 35 in 2nd air-supply way 27A which was constituted in preparation for the end of a cylinder object, and equipped the core housing 37 with the aforementioned flange 25, it is screwed in at the detail in 2nd air-supply way 27B which equipped this soma 36 with the core housing 37. And only movement of the air into the inside air chamber 14 is permitted, and movement of air to the opposite direction is regulated by this 2nd valve core 35. In addition, said spats 24 are inserted between the end face of this soma 36, and the core housing 37, and airtightness is secured.

[0018] Both the valve cores 31 and 35 of both make the general structure specified to JIS (Japanese Industrial Standards). Then, it is as follows when only the composition of the 1st valve

core 31 is explained based on drawing 6 and drawing 7. That is, the 1st valve core 31 fixes and equips with the flange-like rubber stopper 62 the end side of the shaft 61 inserted in the sleeve 60, it is energizing a shaft 61 to one side by the coil spring 63 held in the sleeve 60, and the rubber stopper 62 is pushed against end opening of a sleeve 60 at the usual state (refer to drawing 6). And when air is charged from a rubber stopper 62 and an opposite side among shafts 61, a shaft 61 resists and moves to a coil spring 63 with the atmospheric pressure received in the end face of a shaft 61, and as shown in drawing 7, air passes [ a rubber stopper 62 ] through the inside of a detached building of a sleeve 60 and the 1st valve core 31. On the other hand, since the compressed air from a rubber stopper 62 pushes a rubber stopper 62 against end opening of a sleeve 60, it cannot pass a valve core 31.

[0019] Next, operation of the bulb 20 of this operation gestalt which consists of the above-mentioned composition is explained. Change of the pressure in the outside air chamber 13 at the time of charging the compressed air in a tire 12 from a bulb 20 (Pa) and the pressure in the inside air chamber 14 (Pb) is shown in drawing 8.

[0020] In the state before starting charge, though air is not contained in the internal and external air chambers 13 and 14 or air is contained in them, the pressure of each internal and external air chambers 13 and 14 is the almost same grade as for example both atmospheric pressure (refer to the section of T1 of drawing 8). Moreover, within [ both ] the bulb 20, the 1st and 2nd valve cores 31 and 35 have closed at this time (refer to drawing 2).

[0021] If the air-supply hose which is not illustrated is connected to the charge mouth 28 of a bulb 20 and it begins to charge air, in response to the charge \*\* (Po), the 1st valve core 31 will open (refer to drawing 3), and air will be sent in the 1st air-supply way 26. Here, since the 1st air-supply way 26 is divided with the 2nd air-supply way 27 by the back wall 30, as for the pneumatic pressure which passed the 1st valve core 31, it does not start the 2nd valve core 35 soon, and the 2nd valve core 35 does not open it with a charge start. Moreover, although the air in the 1st air-supply way 26 passes along the reduced pressure path 33 from the outside air chamber 13 and being entered in the 2nd air-supply way 27, compared with the 1st air-supply way 26, atmospheric pressure does not rise rapidly from latus, therefore, as for the outside air chamber 13, the atmospheric pressure in the 2nd air-supply way 27 does not rise rapidly, either. Therefore, the 2nd valve core 35 is not opened from a charge start for the time being, and air is previously supplied only to the outside air chamber 13.

[0022] Now, if air is supplied to the outside air chamber 13 and the pressure in the outside air chamber 13 rises gradually (refer to the section of T2 of drawing 8), in connection with this, the atmospheric pressure in the 2nd air-supply way 27 will also rise. And if the atmospheric pressure in the 2nd air-supply way 27 reaches a predetermined injection-valve opening pressure (Pk), 2nd bulb 35 core will open (refer to drawing 4), and air will be supplied to both internal and external air chambers 13 and 14. And as the atmospheric pressure in the inside air chamber 14 (Pb) follows the atmospheric pressure in the outside air chamber 13 (Pa), it rises gradually (refer to the section of T3 of drawing 8).

[0023] When it goes up until the pressure (Pa) of the outside air chamber 13 becomes the same as charge \*\* (Po) (refer to termination side of the T3 section of drawing 8), the 1st valve core 31 will be in a stoppage state, and air will stop subsequently, entering in a bulb 20 from an air-supply hose, as shown in drawing 5. Later than this, the pressure of the outside air chamber 13 and the inside air chamber 14 becomes the same soon (refer to the section of T4 of drawing 8), the 2nd valve core 35 in the outside air chamber 13 stops (refer to drawing 2), and charge of the air into a tire 12 is completed.

[0024] Thus, according to the bulb 20 of an operation gestalt, since air is supplied to the outside air chamber 13 ahead of the inside air chamber 14, the situation where the inside air chamber 14 expands too much, and the outside air chamber 13 becomes narrow is prevented, and air can be charged with sufficient balance to both the internal and external air chambers 13 and 14. And since it is accepted outside air chamber 13, and it is automatic and the charge through which it passes, and the charge to the inside air chamber 14 are changed, improvement in the efficiency of charge work is achieved compared with what changes these manually.

[0025] The bulb 40 for tires of the <2nd operation gestalt> book operation gestalt is shown in

drawing 9 , and only the composition of a reduced pressure path differs from the aforementioned 1st operation gestalt. That is, the reduced pressure path 41 is making the so-called reducer structure which extracted and connected between the 1st air-supply way 26 and the 2nd air-supply ways 27, as shown in this drawing. Moreover, the cross section of this reduced pressure path 41 is small compared with the gross area of the middle discharge way 32 prolonged on all sides. About other composition, since it is the same as that of the 1st operation gestalt, the same agreement is given to the same part as the 1st operation gestalt, and duplication explanation is omitted to it.

[0026] According to this composition, in the initial stage which charges air in a tire 12, while air is sent in the 1st air-supply way 26 by the big rate of flow and the outside air chamber 13 is supplied through the middle discharge way 32, it decompresses greatly in the reduced pressure path 41, and the 2nd air-supply way 27 is entered. Thereby, in the initial stage of charge, the 2nd valve core 35 will be in a stoppage state, and air will be supplied only to the outside air chamber 13 for the time being. And if the rate of flow of air becomes small with elevation of the atmospheric pressure in the outside air chamber 13, a reduced pressure operation will fall and the atmospheric pressure in the 2nd air-supply way 27 will also go up. Then, the 2nd valve core 35 will be in an opening-of-traffic state, and air will be supplied also to the inside air chamber 14.

[0027] Thus, air is chargeable with sufficient balance to both the internal and external air chambers 13 and 14 with this operation gestalt as well as the aforementioned 1st operation gestalt. Moreover, since the reduced pressure path 41 was established on the same axle of the 1st and 2nd air-supply ways 26 and 27, the reduced pressure path 41 can be formed easily.

[0028] It is not limited to an operation gestalt and an operation gestalt which is explained below is also included in the technical range of this invention, and further, within limits which do not deviate from a summary besides the following, an operation gestalt > this invention besides < can be changed variously, and can be carried out.

(1) Although the tire of the dual structure illustrated in the aforementioned 1st operation gestalt was the structure equipped with the tube 11 inside the tire 12 May make the tire of dual structure into \*\*\*\*, for example, the structure which prepared the inner tire with intensity higher than a tube inside the tire, with the structure equipped with the internal and external air chamber, and Moreover, you may make it the structure which allotted rubber material with intensity higher than the tube 11 to the superficies of the tube 11 of the aforementioned 1st operation gestalt.

[0029] (2) Although the middle discharge way 32 and the reduced pressure path 33 were formed in the direction which intersects perpendicularly with the shaft orientations of the hollow stem 21 with the aforementioned 1st operation gestalt, you may form a middle discharge way and a reduced pressure path in the direction which intersects the hollow stem 21 aslant.

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[Translation done.]



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**TECHNICAL PROBLEM**

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[Problem(s) to be Solved by the Invention] However, by the conventional bulb for tires mentioned above, since both the valve cores 3 and 4 were arranged in in the same air-supply way 2 and the 2nd valve core 4 has met the exhaust port of the 1st valve core 3, the 2nd valve core 4 opens with a charge start in response to the pneumatic pressure from the 1st valve core 3, and much air is previously supplied to the inside air chamber 7 side. For this reason, the situation which a wrap, for example, the tube which is not illustrated, expands the inside air chamber 7 too much, and narrows the outside air chamber 5 within a tire might arise.

[0004] this invention aims at offer of the bulb for tires which can charge air with sufficient balance to the internal and external air chamber of a dual structure tire, in order to solve the above-mentioned technical problem.

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[Translation done.]

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MEANS

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[Means for Solving the Problem] The bulb for tires concerning invention of the claim 1 made in order to attain the above-mentioned purpose To the outside air chamber (13) and inside air chamber (14) with which the tire (12) of dual structure was equipped, are a bulb for tires for charging air, and an outside air chamber (13) is penetrated. The hollow stem which the end exposed to the outside of a tire (12), and the other end faced inside the inside air chamber (14) (21). The spats for jutting out of a hollow stem (21) over the side, fixing an inside air chamber (14) in the periphery section of the hole (11A) which the hollow stem (21) penetrated among wrap interior walls (11), and sealing a hole (11A) (24). The 1st air-supply way which was formed in the interior of a hollow stem (21), was continued and prolonged at the end from the interstitial segment of a hollow stem (21), and was connected to the outside of a tire (12) (26). The 2nd air-supply way which was formed in the interior of a hollow stem (21), was continued and prolonged in the other end from the interstitial segment of a hollow stem (21), and was connected to the inside air chamber (14) (27). The back wall which is prepared in a hollow stem (21) and divides the 1st air-supply way (26) and the 2nd air-supply way (27) (30). The middle discharge way which was formed in the interstitial segment of a hollow stem (21), and connected the 1st air-supply way (26) to the outside air chamber (13) (32). The reduced pressure path which was formed in the interstitial segment of a hollow stem (21), and connected the 2nd air-supply way (27) to the outside air chamber (13) (33). The 1st valve core which is held in the 1st air-supply way (26), permits movement of the air into a tire (12), and regulates movement of the air to the outside of a tire (12) (31). When it holds in the 2nd air-supply way (27) and the inside of the 2nd air-supply way (27) becomes a predetermined pressure, movement of the air into an inside air chamber (14) is permitted, and it has the feature at the place equipped with the 2nd valve core (35) which regulates movement of the air to the outside of an inside air chamber (14).

[0006] To the outside air chamber (13) and inside air chamber (14) with which the tire (12) of dual structure was equipped, the bulb for tires concerning invention of a claim 2 is a bulb for tires for charging air, and penetrates an outside air chamber (13). The hollow stem which the end exposed to the outside of a tire (12), and the other end faced inside the inside air chamber (14) (21). The spats for jutting out of a hollow stem (21) over the side, fixing an inside air chamber (14) in the periphery section of the hole (11A) which the hollow stem (21) penetrated among wrap interior walls (11), and sealing a hole (11A) (24). The 1st air-supply way which was formed in the interior of a hollow stem (21), was continued and prolonged at the end from the interstitial segment of a hollow stem (21), and was connected to the outside of a tire (12) (26). The 2nd air-supply way which was formed in the interior of a hollow stem (21), was continued and prolonged in the other end from the interstitial segment of a hollow stem (21), and was connected to the inside air chamber (14) (27). When air is supplied to the middle discharge way (32) which was formed in the interstitial segment of a hollow stem (21), and connected the 1st air-supply way (26) to the outside air chamber (13), and the outside air chamber (13) The reduced pressure path for decompressing the air in the 1st air-supply way (26), and incorporating it on the 2nd air-supply way (27) (32, 33, 41). The 1st valve core which is held in the 1st air-supply way (26), permits movement of the air into a tire (12), and regulates movement of the air to the outside of a tire (12) (31). When it holds in the 2nd air-supply way (27) and the inside of the 2nd air-supply

way (27) becomes a predetermined pressure, movement of the air into an inside air chamber (14) is permitted, and it has the feature at the place equipped with the 2nd valve core (35) which regulates movement of the air to the outside of an inside air chamber (14).

[0007] Invention of a claim 3 has the feature in the bulb for tires according to claim 2 at the place constituted so that a reduced pressure path (41) might extract the 1st air-supply way (26) and might connect it to the 2nd air-supply way (27).

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] The cross section of the tire of the dual structure concerning the 1st operation gestalt of this invention

[Drawing 2] The cross section of the bulb for tires in the state where the 1st and 2nd valve cores closed [ both ]

[Drawing 3] The cross section of the bulb for tires in the state where only the 1st valve core opened

[Drawing 4] The cross section of the bulb for tires in the state where the 1st and 2nd valve cores opened [ both ]

[Drawing 5] The cross section of the bulb for tires in the state where only the 2nd valve core opened

[Drawing 6] The cross section in the state where the valve core closed

[Drawing 7] The cross section in the state where the valve core opened

[Drawing 8] The graph which showed the allobar of an internal and external air chamber

[Drawing 9] The cross section of the bulb for tires of the 2nd operation gestalt

[Drawing 10] The cross section of the conventional bulb for tires

[Description of Notations]

13 — Outside air chamber

14 — Inside air chamber

17 — The 2nd air-supply way

20 40 — Bulb for tires

21 — Hollow stem

26 — The 1st air-supply way

27 — The 2nd air-supply way

30 — Back wall

31 — The 1st valve core

32 — Middle discharge way

33 41 — Reduced pressure path

35 — The 2nd valve core

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[Translation done.]

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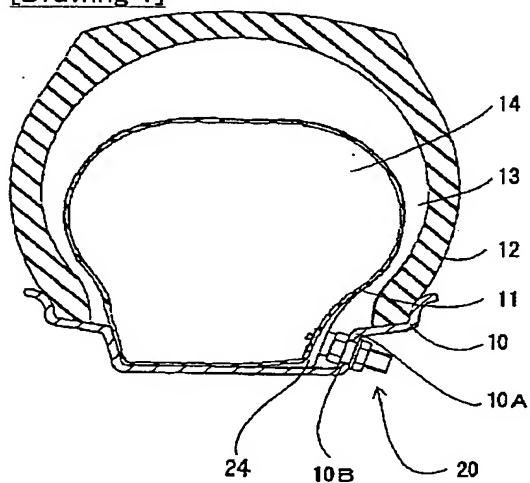
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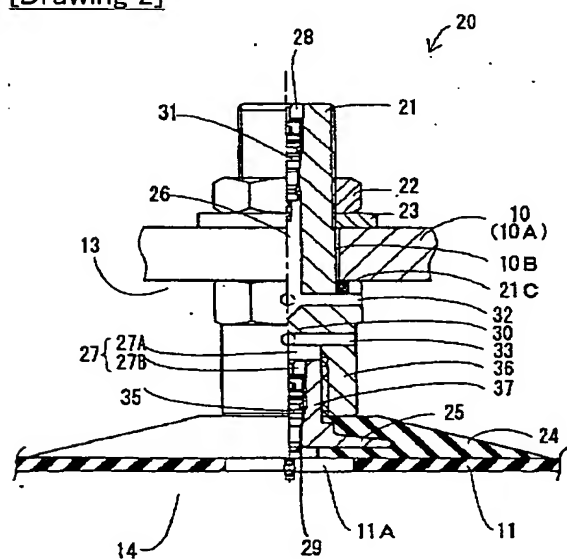
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## DRAWINGS

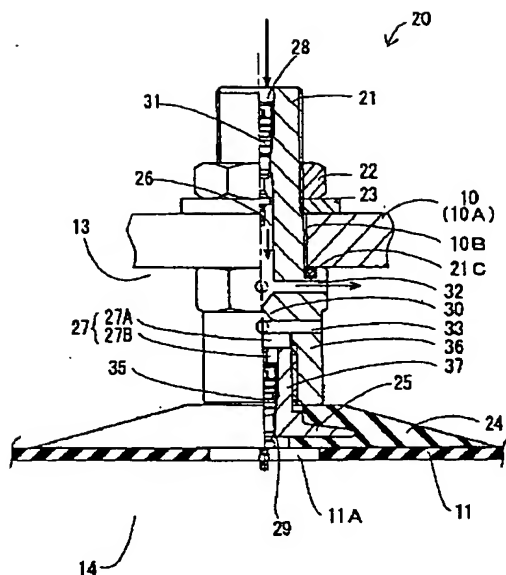
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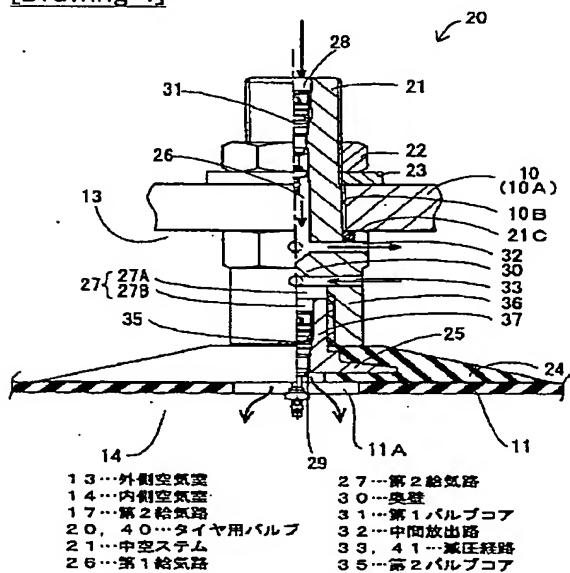
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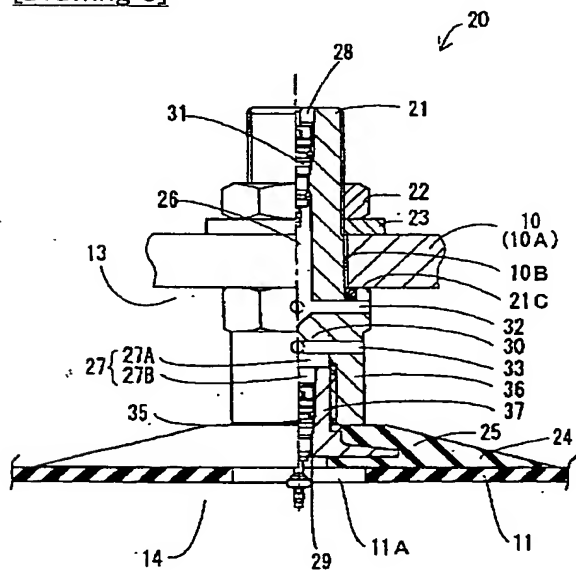
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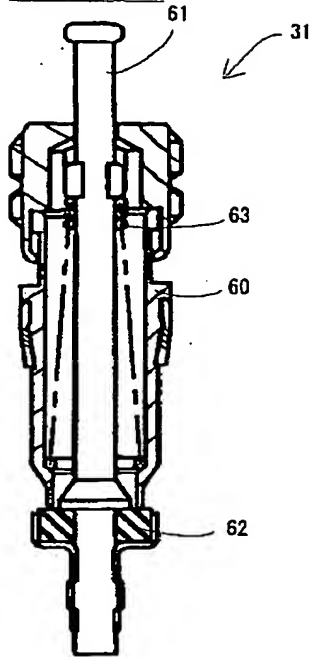
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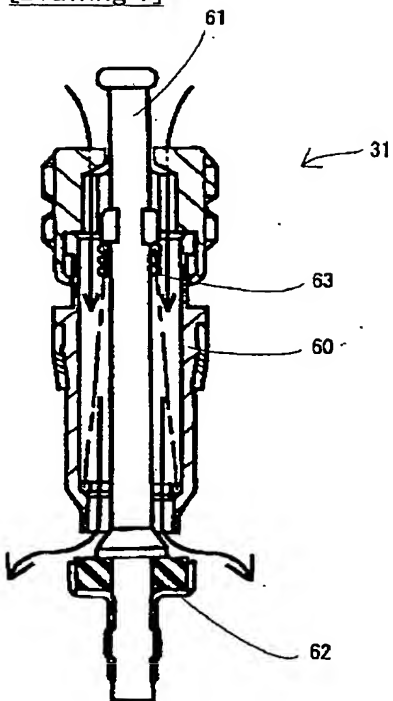
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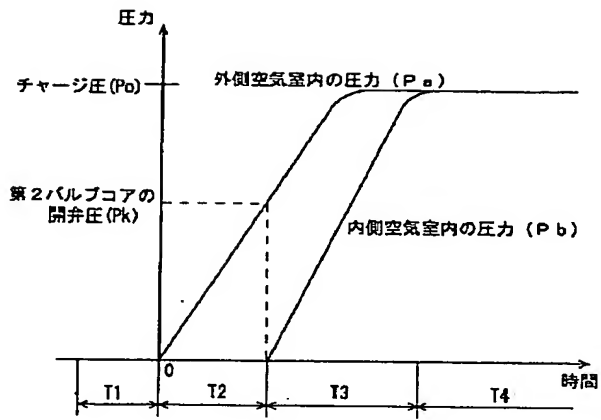
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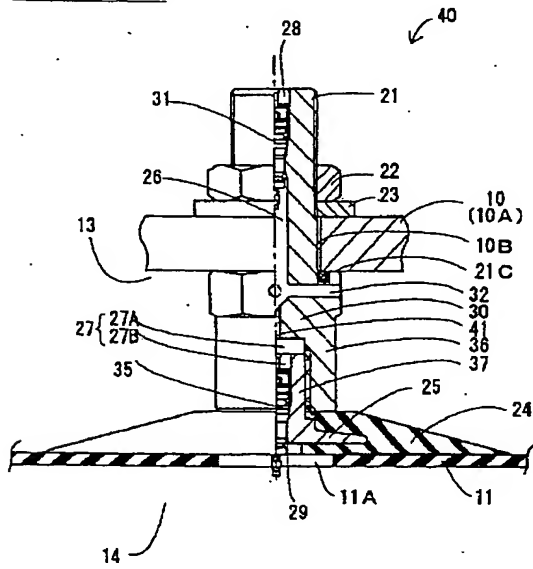
[Drawing 7]



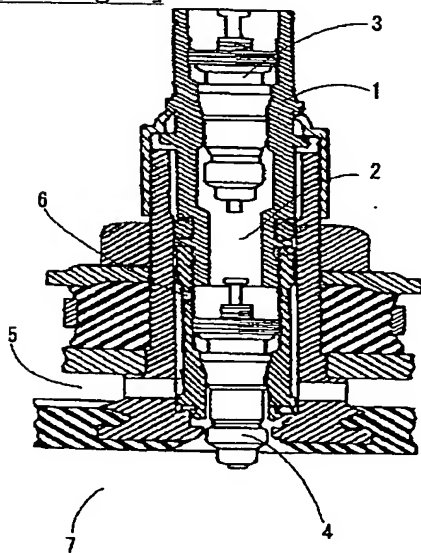
[Drawing 8]



[Drawing 9]



[Drawing 10]



[Translation done.]